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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SMITH, CAROLYN L

ART UNIT

PAPER NUMBER

1631

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/881,234

Applicant(s)

BLAIR ET AL.

Examiner

Carolyn L Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-23 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

In view of the Appeal Brief and amendment filed on 4/5/04, PROSECUTION IS HEREBY REOPENED. The rejections are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claims Rejected Under 35 U.S.C. § 112, Second Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

Applicants make reference to MPEP § 2173.01 that Applicants are their own lexicographers and may use functional language as long as the boundaries of the subject matter

in the claims are clear. It is true Applicants can be their own lexicographers and should state claims clearly so that the metes and bounds of the claims is understood. It is acknowledged that Applicants make reference to MPEP § 2173.02 which suggests how an Examiner should examine 35 U.S.C. 112, second paragraph, issues. Applicants state that the essential inquiry pertaining to this requirement is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. This statement is acknowledged. The phrases rejected below under 35 U.S.C. 112, second paragraph, do not fall into the realm of having a reasonable degree of clarity and particularity for the reasons given below.

Claims 4 (line 4) and claim 16 (line 4), recite the phrase “efficient structure” which is vague and indefinite. It is unclear what criteria or to what degree one considers the structure to be efficient. For example, one definition of “efficient” on the online Merriam-Webster’s dictionary is “productive of desired effects”. Therefore, one of skill in the art would question what characteristics must be present for the structure to contain these desired effects. Clarification of the metes and bounds of this phrase via clearer claim wording is requested.

Applicants direct the Examiner to paragraph 68 which they say defines “efficient structure” as “efficient structure, e.g. 2 bits per nucleotide with appropriate encoding, 5 bits per amino acid residue with appropriate encoding, etc.”. This statement is found unpersuasive as this “e.g.” is an example, rather than a definition that gives clear metes and bounds of the phrase. Applicants state the phrase is not indefinite, but broad. This is found unpersuasive as there are certain elements to this phrase, as discussed above, that lead one of skill not to know how to clearly interpret the metes and bounds of the phrase. Applicants give examples of efficient structure on page 16, second paragraph, of their appeal brief. These examples rely on one

structure being compared to another, such that some type of reference is given to adequately support how the efficiency is perceived. However, the phrase “efficient structure” alone in the claim without such reference to what or how it is more efficient, results in one of skill in the art not knowing how to determine if the structure is in fact efficient.

Claims 7 (line 5) and 19 (line 6), recite the word “efficiently encoded representation of alignment” which is vague and indefinite. It is unclear what criteria or to what degree one considers the representation of alignment to be efficiently encoded. For example, one definition of “efficient” on the online Merriam-Webster’s dictionary is “productive of desired effects”. Therefore, one of skill in the art would question what characteristics must be present for the encoded representation of alignment to contain these desired effects. Clarification of the metes and bounds of this phrase via clearer claim wording is requested. Claims 8-11 and 20-22 are also rejected due to their direct or indirect dependence from claims 7 and 19.

Applicants submit that one of skill in the art would clearly understand the meaning of the above-mentioned phrase. This statement is found unpersuasive as the phrase including the term “efficiently” renders the claim unclear to one of ordinary skill in the art due to the unclarity of the metes and bounds of the word, phrase, and therefore claim. Applicants suggest that the efficient coding entails use of the minimum number of bits needed to represent the data. This minimum number provides a reference point to which one of skill in the art would be able to understand “efficiently encoded”; however, applicants have not shown where in the specification this is explained or sufficiently proven (via documentation) that this definition of this phrase is well known in the art. Thus far, it appears to be merely one interpretation suggested by

Applicants. Meanwhile, there is no clear and definite understanding of this phrase in the claims as they are currently worded.

Claim 8, lines 1-2, recites the phrase “seed point and sum-set membership” which is vague and indefinite. It is unclear how the Applicants intend this phrase to be defined.

Clarification of the meaning of this phrase is requested.

Applicants state that one of skill in the art would readily understand the definitions of the terms “seed” (a matching word/string) and “sum” (a part of the scoring when using BLAST) (page 7, third paragraph of Response). This statement is not supported (via documentation) to provide sound evidence that these terms are well-known in the art. In fact, these terms could have various meanings in the field of bioinformatics and mathematics. Applicants’ statement is found unpersuasive as “Basic Local Alignment Search Tool” by Altschul et al. (1990; see prior art reference in 35 U.S.C. § 103 rejection in previous Office Action, mailed 2/13/03) is an article that describes BLAST in detail, but makes no mention of these particular terms.

Claims 1 (line 16) and 13 (line 22) recite the phrase “said task definition” which is rejected due to the lack of clear antecedent basis. Several task definitions are mentioned previously in these claims so it is unclear to which one this phrase is referring. Claims 2-12 and 14-23 are also rejected due to their direct or indirect dependency from claims 1 and 23.

Prior Art

Applicants’ arguments in the Appeal Brief, filed 4/5/04, will not be addressed as new references or new sections of previously used references were used to construct the 35 USC 103 rejection below.

Claim Rejections – 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. (e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, 6-13, and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (Genome Research, 1996, Volume 6, pages 454-462) in view of Altschul et al. (Journal of Molecular Biology, 1990, Volume 215(3), pages 403-410 and Reed et al. (P/N 5,862,325).

Smith et al. describe an integrated set of World Wide Web pages that organize nucleic acid sequence searches and analyses available by function and provide a single entry for related searches (abstract) which represents a “system” which is defined by the online Merriam-Webster dictionary as an integrating group of items forming a unified whole as well as an organization forming a network especially for distributing something serving a common purpose. This system

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provides a method of performing different searches for a given query sequence (query dataset N) with various sequence databases (i.e. BLAST database which represents subject dataset M) (abstract; page 455, col. 2, first paragraph; and page 457, col. 2, first paragraph) which represents a method of comparing datasets. Smith et al. describe nucleic acid sequence search services, involving genomic databases in Table 1, as stated in instant claims 12 and 23. Smith et al. describe a sequence input field which for nucleic acid searches (page 455, col. 1, third paragraph to col. 2, first paragraph) which is well known in the art to be divided into nucleotides (data elements). The presence of an input field suggests that there is a size limitation with a specified range, such as being more than zero but less than infinity. Smith et al. describe BLAST nucleic acid sequence searches in Table 1, including a dbEST DB. This EST (Expressed Sequence Tag) database subset represents a division of the BLAST database (subject dataset) which has a size within a specified range, as stated in instant claims 1 and 13, since EST is defined online Genome Glossary as a short (size) strand of DNA that is part of a cDNA molecule. Smith et al. describe using the Internet allowing for communication between remote sites and promoting a distributed information space by filling out a HTML form (user input query) on a web page (at a master CPU (central processing unit)), launching a search at a remote site (slave CPU), returning results for further processing by the BCM Search Launcher server (another slave CPU), and presenting results to the user (from original master CPU) (page 459, col. 2, third paragraph). As the master-slave is defined by online Webopedia as “an architecture in which one device (master) controls one or more other devices (the slaves), the description provided in the sentence above represents sending information to a master CPU of a master-slave distributed computing platform (via query input) by sending data elements referenced by a task definition to said slave

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CPU, performing each task (i.e. comparison search and further processing) on a slave CPU and returning task results for each task to said master CPU. Smith et al. describe using a plurality of servers (slave CPUs) that can return results to the user's system (master CPU) with additional links to auxiliary information that was initiated from a single entry page (abstract and page 455, col. 1, third paragraph). Smith et al. describe user (at master CPU) selecting task definitions such as specified search parameters, choosing a search server (an executable element capable of performing comparisons) with a form tag, selecting a function type to submit the form containing user input (all available data elements and task definitions) to an external program (an executable element capable of performing comparisons), and sequence name/identifier (query and subject data element identification/descriptor) (page 459, col. 2, third paragraph to page 460, col. 1, third paragraph). Smith et al. describe being able to specify one or more query parameter values (page 460, col. 1, fourth paragraph) which represents more than one data element dataset that can be query or subject in nature, as the term "subject" is a very broad term. Smith et al. describe generating a BLAST report for each query data element as seen in Figure 2 (3). Smith et al. describe concatenating results (page 454, col. 2, first paragraph and page 457, col. 2, first paragraph) from all BLAST reports (page 461, col. 1, second paragraph) to produce a text file identical to blastall run of query and subject datasets as seen in Figure 2 and Figure 2 caption (page 459), as stated in instant claims 10, 11, 21, and 22. Smith et al. describe storing seed point and sum-set membership of each alignment in BLAST as seen in Figure 2 (third window from top on left side), as stated in instant claim 8. Smith et al. describe storing results from tasks into results files including query and subject sequence data and metadata corresponding to the task that the results came from, links to sequences that are similar to sequence matched in database

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search (metadata for the subject sequence) (page 455, col.2 , last paragraph to page 456, col. 1 and 2), partial subject sequence data corresponding to the subject bounds of the significant alignment result, and other results data (see Figure 2), as stated in instant claims 9 and 20. Smith et al. describe a list (index) of information about query and subject sequence (i.e. third and fourth windows from top left as well bottom right window in Figure 2), including bounds information for start and stop of subsequences (i.e. third window from top left of Figure 2), storing data including hits, scores, identities, and positives (data quantifying fulfillment of significance criteria for a significant match (i.e. third window from top left of Figure 2), and storing an efficiently encoded representation of alignment between said bounds corresponding to a high scoring pair (see alignment in third window from top left of Figure 2), as stated in instant claims 7 and 19. Smith et al. do not describe compressing and uncompressing data as well as looping processes.

Altschul et al. describe compressing the database by packing 4 nucleotides into a single byte and using a table to delimit the boundaries between adjacent sequences (page 405, col. 1, lines 37-40). Altschul et al. describe beginning with a matrix of similarity scores for all possible pairs of residues (page 404, col. 1, paragraph 3) which represents determining the number of tasks for an entire comparison of two datasets. Altschul et al. describe performing BLAST with two random sequences (data sets N and M) of lengths m and n in order to determine the probability of finding a segment pair with a score greater than S (cut off score, page 404, col. 2, second paragraph) where $y = Kmn e^{-\lambda S}$ (page 405, col. 2, equation 1 and fourth paragraph) which represents determination of a number of tasks or points in a matrix in a comparison of two datasets (i.e. N and M) involving a multiplication of data elements $n_N \times n_M$, as stated in instant

claims 1 and 13. Altschul et al. describe the sequence segments can be of any length (page 404, col. 1, lines 34-36) or certain short sequences thus having a specified range (page 404, col. 2, lines 61-63). Altschul et al. use a list, or index, of all 12-mers in a query sequence in one example (page 405, col. 1, lines 33-35).

Reed et al. describe a system and methods that coordinate the transfer of data, metadata, and instructions between databases to control and process communications (abstract and col. 1, lines 10-14) which represents a separation or stripping of metadata from data. Reed et al. describe this transfer of metadata and methods allow for the control by the provider and consumer of the types and contents of information subsequently transferred (abstract) which represents storing minimal information if so desired. Reed et al. describe compressing database, database query, or other file format using PKZIP (col. 14, lines 41-47 and col. 53, line 1) that represents packing data into an efficient structure using a redundancy reduction data compression method. Reed et al. describe corresponding data, metadata, and instructions in the provider program can control and automate decryption and decompression of data (col. 14, lines 47-51). Reed et al. describe communication networks that allow both parties to control, filter, store, index, and process communications from each other (col. 7, lines 63 to col. 8, line 2) which represents creating an index in an uncompressed manner. Reed et al. describe querying a provider database and loops through each communication object instance (data) which is to be published and which are read (col. 32, lines 28-35) which represents a looping of data (i.e. query sequences) to perform setup, preprocessing, and table generation. Reed et al. describe the program begins a second loop through each recipient and using such recipient attributes and

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methods to generate and transmit a communications object instance for all recipients (col. 32, lines 35-42) which represents a looping of other data such as the looping of subject sequences.

Smith et al. state sequence analysis services are extremely useful for molecular biologists to allow access to the ever-expanding sequence data bases without requiring copious local data base storage, frequent data base updates, the cost of expensive and sophisticated hardware and software, and the cost and effort of continuous system maintenance (page 454, col. 1, first paragraph). Smith et al. state that the individual WWW server sites scattered throughout the Web hinders their efficient use (page 455, col. 1, first paragraph). Smith et al. state the BCM Search Launcher addresses these limitations by providing an improved interface to simplify access and improve analysis resources (page 455, col. 1, second paragraph). A skilled artisan in the art would have been motivated to make improvements to analysis server sites, such as that stated by Smith et al. (page 455, col. 1, first paragraph) additional features to further simplify access and improve analysis resources (page 455, col. 1, second paragraph). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to compress data (as stated by Altschul et al. and Reed et al.) and looping processes (as stated by Reed et al.) in order to offer enhanced, integrated, easy-to-use, and time-saving techniques to a large number of useful molecular biology database search and analysis services for organizing and improving access to these tools for genome researchers worldwide (Smith et al., page 459, col. 1, third paragraph to col. 2, first paragraph).

Thus, Smith et al. in view of Altschul et al. and Reed et al. motivate the limitations in claims 1, 4, 6-13, and 18-23.

Conclusion

No claim is allowed.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR §1.6(d)). The CM1 Fax Center number is (703) 872-9306.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carolyn Smith, whose telephone number is (571) 272-0721. The examiner can normally be reached Monday through Thursday from 8 A.M. to 6:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Woodward, can be reached on (571) 272-0722.

Any inquiry of a general nature or relating to the status of this application should be directed to Legal Instruments Examiner Tina Plunkett whose telephone number is (571) 272-0549.

June 22, 2004


ARDIN H. MARSCHEL
PRIMARY EXAMINER 6/28/04